

Communications and Networking

Accelerating the Convergence of Communications, Networking and Computing Technologies

Today we have independent interactions with our work computer, home computer, cell phone, home phone, office phone, PDA, VCRs, digital cameras and all the other electronic devices in our lives. At Intel Labs, we envision a world where any intelligent device can effortlessly communicate with any other intelligent device using the best available communications channel. We focus on all technologies that enable data communications — high-speed Internet, optical switching, wireless, cellular, and phone lines. Working across the industry, we're helping to develop technologies and standards that will lead to a true convergence in the ways we communicate with digital devices and each other.

Building Blocks of the Internet

The world is at work on a massive infrastructure construction project and we're developing a better brick. Lots of them. We're providing network infrastructure technologies that will enable great compatibility, extended product cycles, decreased time to market, and better network management and security. A large part of our work focuses on reducing the design burdens for equipment manufacturers by developing standards-compliant network components. Our network processors are a good example. They accelerate the implementation of new services in network equipment.

Wireless Internet on a Chip

A new process technology we're working on combines core components of today's cellular phones and handheld computers. This integrated, "wireless-Internet-on-a-chip" technology is designed to enable a new era of wireless Internet-access products with much longer battery life and greater processing power. The new process technology integrates Intel's leading-edge logic (microprocessor) and flash memory technologies and analog communications circuits on a single piece of

silicon. This new technology promises to open the doors to a wide range of mobile devices combining computing and Internet connectivity. The "wireless-Internet-on-a-chip" supports Intel® Personal Internet Client Architecture – Intel's development blueprint designed to accelerate the delivery of next-generation applications for high-performance, ultra low-power mobile devices combining voice communications and Internet access.

Networking on the Go

Today a mobile computer is a client always on the lookout for a connection. We're developing new mobile and wireless middleware for advanced applications to enable secure and spontaneous group collaboration, intelligent roaming between disparate networks, and even natural forms of input such as speech recognition. In the future, a mobile computer may well be as connected as a desktop in the office.

Going Wireless at Home

There are many cases where distance isn't a factor in data communications. It's speed you want. For these short-range, high-data-rate communications, Ultra Wide Band (UWB)

technology could be the answer. UWB replaces high power narrow-band transmissions with very low-power but extremely wide-band signals. Once used solely for radar-based applications, recent developments in high speed switching technology make UWB more attractive for low-cost consumer communications applications such as a high speed connection between two computers in your home. We're exploring this technology that removes the wires and sees through walls.

Building Machines Measured in Nanometers

Micro Electro-Mechanical Systems (MEMS) is a technology similar to silicon technology. Both deal with the ultra small. Our R&D efforts focus on ways ultra-microscopic electro-mechanical systems machines can be combined with integrated circuits on silicon for applications in wireless and optical networks, biomedicine, and many other fields. Leveraging our experience in silicon fabrication and applying it to MEMS, we may one day be able to build radios right into the silicon of our microprocessors. To accelerate our progress in MEMS, we're working with major universities and have made strategic investments in a number of companies.

A New Kind of Internet Building Block

High speed, low-cost optical components will be an important building block of the Internet of the future. Capitalizing on our extensive experience in silicon manufacturing, we're developing a novel silicon-based optical switching technology, silicon-based photonics, that will enable us to integrate electronics and optics on a single die. These agile, low-cost, intelligent photonic modules may prove essential to enabling the next generation of optical networks.

The Coming Convergence

The last 30 years have seen incredible advances in computing, communications and networking. Think how quickly technologies like cellular phones, Internet, e-mail, handheld computers and wireless home networks have become part of our lives. Today the world is full of new devices that have one thing in common. They're digital. Our goal is to capitalize on that commonality by enabling all devices that can profit from an interaction with one device to automatically recognize that interaction. The interaction can be as simple as snapping a digital photograph and having a PC miles away store it. It can be as extensive as sensors in intelligent devices recognizing your arrival and preparing themselves for your immediate use. At the heart of this convenience is the PC, capable of controlling and lending intelligence to all our digital devices. To speed the coming convergence, we're working on everything from less expensive communications solutions for devices to network building block components that make it easier to produce products faster, upgrade them more easily and use them longer.

About Intel Labs

Intel Labs are the R&D arm of Intel. We have more than 6,000 researchers and scientists in 80 labs around the world. Our decentralized structure allows us to tackle a broad range of research projects. The labs are closely aligned with Intel's business units and focus on R&D for technologies and products that specifically address the needs of our customers.

Designing the Future

Find out more about Intel Labs by visiting www.intel.com/labs. The digital world of tomorrow is in our labs today.

This document and related materials and information are provided "as is" with no warranties, express or implied, including but not limited to any implied warranty of merchantability, fitness for a particular purpose, non-infringement of intellectual property rights, or any warranty otherwise arising out of any proposal, specification, or sample. Intel assumes no responsibility for any errors contained in this document and has no liabilities or obligations for any damages arising from or in connection with the use of this document.

Intel and Intel Personal Internet Client Architecture are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

*Other names and brands may be claimed as the property of others.
Copyright © 2001, Intel Corporation. All rights reserved. Printed in USA

